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BYEMAN

BYE 8964-68  
Copy 3 of 4.

17 April 1968

MEMORANDUM FOR : Deputy Director for Science and Technology  
SUBJECT : NPIC Evaluation of First Six BLACK SHIELD  
Missions

1. This memorandum is for your information only.
2. Attached are copies of NPIC evaluations of the first six BLACK SHIELD missions. You may wish to refresh your memory on sensor performance during our early missions.

EO/SA-----

  
~~JOHN PARANGOSKY~~  
Acting Director, Special Activities

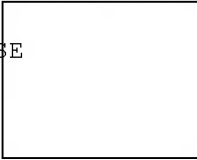
Attachments:

Xeroxed copies of:

BYE-50249/67

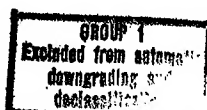
BYE-50288/67

APPROVED FOR RELEASE  
DATE: AUG 2007

 115(IN 84657)  
406(IN 90304)  
472(IN 92929)  
473(IN 92945)

Distribution:

- Copy 1 w/att - DDS&T
- Copy 2 w/o att - DDS&T Reg
- Copy 3 w/o att - DD/SA chron
- Copy 4 w/o att - RB/OSA



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Control System

BYE-50249/67  
21 June 1967

Copy 1

MEMORANDUM FOR: Director, Office of Special Activities, DDS&T

ATTENTION:

SUBJECT: Technical Evaluation of Mission BSX 001 of  
31 May 1967

1. Mission BSX 001 is the first operational photographic mission with the A-11 aircraft employing a Type I camera system. The mission covered portions of North Vietnam, Thailand, Laos and the demilitarized zone in Vietnam. Camera serial number E was used. The negatives and reproductions were processed at Eastman Kodak using standard operating and processing procedures established during the processing of test missions from this camera system.

2. The quality of the photography is good providing ground resolutions of 1.6 to 1.8 feet at nadir (example: frame 1184). At 45 degrees obliquity the ground resolution is approximately 2.2 to 2.4 feet (example: frame 1194). During the low altitude portion of the mission (29,700' to 65,100') resolution of approximately 0.9 to 1.2 feet can be detected (example: frame 888). The resolution of the photography acquired during turns is commensurate with the scale provided by the slant range (example: frame 437). There was no acquisition during descending portions of the flight. The acquisitions during the slow ascent across Thailand are good providing some of the best resolution of the mission (example: frame 888).

3. A physical evaluation of the negative provides the following information:

a. There are minus density lines introduced by foreign matter in the slit aperture. On the forward material these

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BYE-50249/67

SUBJECT: Technical Evaluation of Mission BSX 001 of  
31 May 1967

lines are 6.40, 5.50, 5.10, 2.20 and 1.60 inches from the edge nearest the clocks (example: frame 17). On the aft material these lines are 5.30, 1.40 and 0.15 inches from the same edge (example: frame 18).

b. The timing track drifts off the clock-edge of the film in the first 48 frames. The first 36 frames are overlapping which is attributed to short duration of camera on-time and the time required for the film to adjust to proper velocity. There is minor overlapping (one inch maximum) intermittently throughout the mission.

c. A manufacturing splice obliterated all data chamber information for frames 1089/1090. Heat splices are present between frames 339/342; 683/686; and 1031/1034 where the negatives were cut for ease of handling during processing.

4. There are approximately 400' of pre-flight material. The following is a profile of the mission material. All frames, original negatives and reproductions, titled TOP SECRET AKRA have been retitled SECRET.

Pre-Flight - Unclassified - No Reproduction  
Frames 1-30 - TOP SECRET AKRA - No Reproduction  
Frames 31-664 - SECRET - Routine Reproductions  
Frames 665-1070 - TOP SECRET AKRA - Routine Reproductions  
Frames 1071-1494 - SECRET - Routine Reproductions  
Frames 1495-1508 - TOP SECRET AKRA - No Reproductions

5. During the low level portion of the mission, the photography in isolated areas of a few frames (noticeably 776 and 778) contain double imagery. The cause of this anomaly cannot be associated with vehicle vibration, roll, pitch or yaw rate. It does not appear in the entire slit aperture, nor does it appear in the same location on successive frames. The general opinion is that

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BYE-50249/67

SUBJECT: Technical Evaluation of Mission BSX 001 of  
31 May 1967

it may be caused by either a localized temperature difference on the window in this particular area or a peculiar air flow across the window causing a secondary refraction at the lower altitude where the air is more dense. The areas are approximately two centimeters in diameter and have only been detected at approximately 40-42 degrees obliquity on the aft material at altitudes under 50,000 feet.

6. Portions of the mission were flown with programmed V/H and portions with scanned V/H; portions were acquired with the camera in caged vs uncaged status; no difference in resolution or acuity can be detected that can be attributed to the V/H signal or the caged status.

7. The INS and data chamber latitude and longitude, together with the principal point of the photography at zero scan angle, were plotted to determine variances. Frames 277 and 625 from the early portion, and frames 801 and 1197 from the later portion of the mission were used. The direction of flight was developed by drawing a line through a series of INS zero scan points. The plots are included as attachment 1.

8. Edge traces developed from frames 888 and 1194 are included as attachment 2.

9. A comparison was made between the V/H indicated by the film velocity and the V/H recorded on the INS tape. The film velocity was determined using a nomograph (7E6616-REV A) supplied by the manufacturer. The comparison included as attachment 3 was determined from the frame timing marks and the corresponding record on the INS tape.

10. A chronological sequence of events affecting the handling and exploitation of the mission at NPIC are listed in attachment 4. The times are listed in Greenwich Mean Time (ZULU), Eastern Daylight Saving Time (EDST) and elapsed time from the time the vehicle landed.

11. A mensuration analysis is not included with this report.

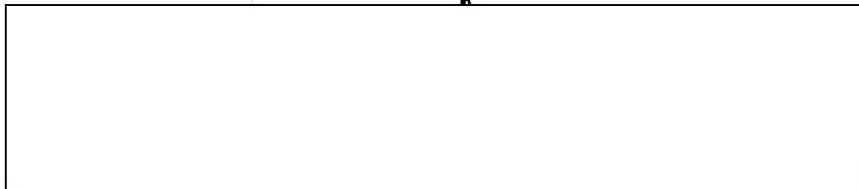
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BYE-50249/67

SUBJECT: Technical Evaluation of Mission BSX 001 of  
31 May 1967

12. Two spot checks on the altitudes obtained from the INS tape modified by the D values received in the REALM-242 were inconclusive. Extensive cloud cover limited the number of checks. AMS map of Vietnam, sheets 6250 111 and 6250 1, series L 7014, 1:50,000, were used for these altitude checks. An aerial resection was not attempted because of the lack of control data of the area covered.



Attachments:

1. Plots
2. Edge Traces
3. Comparison between V/H indicated by film velocity and V/H recorded on INS tape
4. Chronological List of Events

Distribution:

cy 1 - OSA/DDS&T/CIA, w/a✓

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BYE-50288/67  
27 June 1967

Copy 1

MEMORANDUM FOR: Director, Office of Special Activities, DDS&T

ATTENTION:

SUBJECT: Technical Evaluation of Mission BSX003 of  
10 June 1967

1. Mission BSX003 is the second operational photographic mission employing the Type I camera system. It is a relatively short mission containing 760 frames. Camera Serial Number F was used. The negatives and reproductions were processed at Eastman Kodak.

2. The negatives are underexposed approximately a full stop. The quality of the photography is good providing ground resolutions of 1.5 to 1.75 feet at nadir to 3 to 5 feet at the high obliquity angles. There are no acquisitions during ascending or descending portions of the mission. The altitude ranged between 77,000 and 81,000 feet.

3. Image smearing associated with excessive vehicle roll and pitch rates is present on some portions of the mission. Frames 375 through 380 contain examples of this anomaly.

4. A physical evaluation of the negative provides the following information.

a. Minus density lines introduced by foreign matter in the slit aperture are minimal.

b. The new method of indicating camera status (caged) and programmed V/H provides the necessary information and does not introduce plus density lines in the format.

c. There is a manufacturing splice in frame 564 and heat splices, where the negative was cut for ease of handling, between frames 311/314 and 483/486.

GROUP 1  
Excluded from automatic  
downgrading and  
declassification

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SUBJECT: Technical Evaluation of Mission BSX003 of  
10 June 1967

5. The cameras were operated in programmed V/H for the entire mission. Portions were acquired with the camera in a caged status versus uncaged; no difference in resolution or acuity can be detected that can be attributed to the caged status other than those mentioned in paragraph 3.

6. A comparison was made between the V/H indicated by the film velocity and the V/H recorded on the INS tape. The film velocity was determined using a nomograph (7E6616-REV-A) supplied by the manufacturer. The comparison included as Attachment 1 was determined from the timing marks and the corresponding record on the INS tape.

7. A chronological sequence of events affecting the handling and exploitation of the mission at NPIC are listed in Attachment 2.

8. The INS and data chamber latitude and longitude, together with the principal point of the photography at zero scan angle, were plotted to determine variances. Frames 227, 327 and 749 were used. The direction of flight was developed by drawing a line through a series of photographic zero scan points. The plots are included as Attachment 3.

9. The camera manufacturer requested a listing of the frame numbers that are overlapping and the amount of overlap. Attachment 4 is a table listing these overlapping frames together with frames that contain a portion of the data chamber in the format.

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BYE-50288/67

SUBJECT: Technical Evaluation of Mission BSX003 of  
10 June 1967

## Attachments:

1. Comparison between V/H indicated by film velocity and recorded on tape.
2. Chronological List of Events.
3. Plots.
4. Table of overlapping frames and frames containing portions of Data Chamber.

## Distribution:

cy 1 - OSA/DDS&T/CIA, w/a ✓

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CLASSIFIED MESSAGE

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ROUTING

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ROUTING

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HRC	RCS
CRP	FILE

IN 84657

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TO INFO

CITE

~~SECRET~~ 291543Z CITE 1115

PRIORITY

OXCART/BLACKSHIELD

REF 6564

SUBJ: TECHNICAL EVALUATION OF MISSION BX6705

1. MISSION NUMBER: BX6705

2. CAMERA NUMBER/SERIAL NUMBER/FOOTAGE PROCESSED:

TYPE I/G/3902

3. TYPE OF FILM: 3404

4. QUALITY EVALUATION:

A. EXPOSURE: THE NEGATIVES ON THE FIRST HALF OF THE MISSION ARE UNDEREXPOSED, ESPECIALLY AFT CAMERA FRAMES. IMAGE DEGRADATION IS APPARENT BUT NOT SEVERE. FULL PROCESSING WAS NECESSARY FOR THE ENTIRE MISSION TO PROVIDE NEGATIVES OF ADEQUATE DENSITY.

B. METERING: NORMAL. THE FWD AND AFT CAMERA FRAMES OVERLAP THROUGH THE DATA BLOCK AREAS APPROXIMATELY 4.0 INCHES

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 GROUP 1  
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AND DECLASSIFICATION

IN 84657

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PAGE TWO

ON FRAMES 51 THROUGH 501. THIS IS THE RESULT OF IMPROPER SCAN SYNCHRONIZATION AND NOT METERING AS REPORTED IN PREVIOUS PRELIMINARY EVALUATIONS. SMEARED (ELONGATED) IMAGERY IN THE SCAN DIRECTION IS PRESENT ON THESE FRAMES; HOWEVER, DEGRADATION IS NOT SEVERE.

C. DATA RECORDING: OPERATIONAL THROUGHOUT THE MISSION.

D. PHYSICAL DEFECTS: FOREIGN MATTER IN THE SLIT APERTURE CAUSED MINOR THIN DENSITY STREAKS ON THE AFT CAMERA FRAMES. OTHER PHYSICAL DEFECTS ARE MINIMAL.

E. WEATHER: TWENTY PERCENT CLOUD COVER.

5. REMARKS: IMAGE QUALITY ON FRAMES 503 THROUGH THE END OF THE MISSION IS GOOD AND COMPARABLE OR SLIGHTLY BETTER THAN MISSIONS BSX001 AND BSX003. IMAGE DEGRADATION IS PRESENT ON APPROXIMATELY THE FIRST 500 FRAMES AS A RESULT OF THE SCAN SYNCHRONIZATION PROBLEMS MENTIONED IN ITEM 4B. NO INERTIAL NAVIGATION SYSTEM (INS) DATA WAS RECEIVED FOR FRAMES 1, 467 THROUGH 483, 657 THROUGH 1189 AND 1511 THROUGH 1535. DATA FOR FRAMES 19 THROUGH 31, 485 THROUGH 495, 639 THROUGH 649 AND 1191 THROUGH 1195 ARE INACCURATE IN THE FINAL FRAME EPHEMERIS BECAUSE OF INSUFFICIENT INS DATA.

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TOP: 291556Z JUN 67

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FIG 9-25

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PRIORITY [ ]

PART

SUBJECT: EVALUATION OF BLACK SHIELD MISSION BX6706

1. CAMERA SERIAL E, TYPE I, WAS USED ON MISSION BX6706.

EXPOSURE WAS GOOD. PROCESSING WAS ACCOMPLISHED AT [ ]

THERE ARE A TOTAL OF 1,372 FRAMES IN THE MISSION.

2. BOTH CAMERAS OPERATED SATISFACTORILY THROUGHOUT THE MISSION; DURING THE STRAIGHT AND LEVEL PORTIONS OF THE FLIGHT GROUND RESOLUTION OF 18 INCHES (1 BAR PLUS 1 SPACE) WAS OBTAINED IN THE VERTICAL PORTIONS OF THE PHOTOGRAPHY. OBJECTS AS SMALL AS ONE FOOT ARE DETECTABLE. THE RESOLUTION AT OBLIQUITY ANGLES IS COMENSURATE WITH THE DEGREE OF OBLIQUITY; AT 45 DEGREES THE RESOLUTION VARIES BETWEEN TWO AND THREE FEET.

3. A GOOD CORRELATION WAS OBTAINED BETWEEN THE INS DATA, PHOTOGRAPHIC IMAGERY AND THE DATA CHAMBER RECORDINGS. THE LOG IN THE DATA CHAMBER STOPPED AT 1 HOUR AND 56 MINUTES AFTER MISSION INITIATION (FRAME 611); THE LATITUDE AND LONGITUDE FROM

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2

THE DATA CHAMBER WAS USED FOR CORRELATION OF THE BALANCE OF THE MISSION.

4. FRAMES 1-658 WERE EXPOSED AT  $1/190$  OF A SECOND, FRAMES 659-1072 WERE EXPOSED AT  $1/170$  OF A SECOND AND FRAMES 1073-1372 WERE EXPOSED AT  $1/190$ . ALL FRAMES RECEIVED FULL PROCESSING AND THE DIFFERENCES IN EXPOSURES CANNOT BE DETECTED. BOTH EXPOSURES ARE ACCEPTABLE FOR THE TERRAIN REFLECTIVITY OVER WHICH THEY WERE FLOWN. A LONGER EXPOSURE WOULD PROVIDE MORE INFORMATION ON CLOUD SHADOW AREAS BUT COULD CAUSE TOO HEAVY A DENSITY THOROUGHOUT THE BALANCE OF THE IMAGERY. LESS THAN TWO PERCENT OF THE IMAGERY IS IN CLOUD SHADOWS, THEREFORE, IT IS RECOMMENDED THAT THE PRESENT EXPOSURE BE USED AS THE STANDARD UNTIL THERE IS A CHANGE IN THE SOLAR ELEVATION OR OTHER CONDITIONS THAT WILL AFFECT THE EXPOSURE.

5. NO PHOTOGRAPHY WAS ACQUIRED DURING THE ASCENDING AND DESCENDING PORTIONS OF THE MISSION. THE ALTITUDE RANGED BETWEEN 30,000 AND 31,000 FEET. NO DATA REDUCTION PROBLEMS WERE ENCOUNTERED DURING VEHICLE MANEUVERING.

6. A TIME HISTORY OF EVENTS AFFECTING THE EXPLOITATION OF THE MATERIAL AT SPECTRE BASED ON ELAPSED TIME FROM A/C TOUCHDOWN IS:

TIME

- MIN EVENT
- 30 RECEIPT OF INS TRANSMISSION
- 07 RECEIPT OF D-VALUES
- 39 MATERIAL ARRIVED AT KWBAIL
- 30 RECEIPT OF UNTITLED REPRODUCTIONS AT SPECTRE

44-00 FINAL FRAME EPHEMERIS COMPLETED

49-00 INITIAL READ OUT COMPLETED

54-30 IPIR SENT FROM SPECTRE

7. FRAMES 1073-1149 WERE ACQUIRED WITH SCANNED V/H, THE BALANCE OF THE MATERIAL WAS ACQUIREDED WITH PROGRAMMED V/H. NO DIFFERENCE COULD BE DETECTED IN THE IMAGERY. THE CAMERA SYSTEM CAGED 16 TIMES INCLUDING THE CAGING THAT IS NORMALLY EXPECTED IN TURNS. THE CAGING INDICATOR IN THE DATA CHAMBER DOES NOT CORRELATE EXACTLY WITH THE CAGING INDICATIONS ON THE INS TAPE BUT THIS IS ATTRIBUTED TO MICROSECOND DELAYS IN THE TWO SYSTEMS.

8. THERE IS NO INS DATA AVAILABLE FOR FRAMES 9,17,657 AND 1071. THESE FRAMES WERE ACQUIRED DURING CAMERA RUN-DOWN AFTER A CAMERA OFF AND ARE CONSIDERED BONUS FRAMES.

9. THE FILM METERED PROPERLY THROUGHOUT THE MISSION WITH THE ONLY OVERLAP OCCURRING AT CAMERA OFF/ONS. MINUS DENSITY STREAKS, CAUSED BY FOREIGN MATTER IN THE SLIT APERTURE, ARE MINIMAL.

10. CLOUDS OBSCURED 30 PERCENT OF THE PHOTOGRAPHY. GROUND HAZE IN THE VALLEYS AND ALONG THE COAST REDUCED THE ACUITY OF THE IMAGERY IN THOSE AREAS.

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CLASSIFIED MESSAGE

147G. 9-65

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OSA 1-20

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CITE

PRIORITY

OXCART

SUBJECT: EVALUATION OF BLACK SHIELD MISSION BX6708

File

1. CAMERA SERIAL F, TYPE I, WAS USED ON MISSION BX6708. THE EXPOSURE WAS GOOD. PROCESSING WAS ACCOMPLISHED AT KWBAIL. ALTHOUGH 1946 FEET OF FILM WAS USED ON THIS MISSION, HEAVY CLOUD COVER NEGATED ALL BUT 324 FRAMES. THE ONLY FRAMES REPRODUCED WERE FRAMES 117-272 AND 337-404. THESE FRAMES PROVIDED GOOD RELATIVELY CLOUD FREE COVERAGE IN THE MAIN AREAS OF INTEREST.

2. BOTH CAMERAS OPERATED SATISFACTORILY THROUGHOUT THE MISSION. DURING THE STRAIGHT AND LEVEL PORTIONS OF THE FLIGHT GROUND RESOLUTIONS OF 16 TO 18 INCHES (1 BAR PLUS 1 SPACE) WERE OBTAINED IN THE VERTICAL PORTIONS OF THE PHOTOGRAPHY. OBJECTS AS SMALL AS ONE FOOT ARE DETECTABLE. THE RESOLUTION AT OBLIQUITY ANGLES IS COMMENSURATE WITH THE DEGREE OF OBLIQUITY; AT 45 DEGREES THE RESOLUTION RANGES BETWEEN TWO AND THREE FEET.

3. A GOOD CORRELATION WAS OBTAINED BETWEEN THE INS DATA, THE

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PHOTOGRAPHIC IMAGERY AND THE DATA CHAMBER RECORDINGS.

4. FRAMES 1-335 WERE EXPOSED AT 1/210 OF A SECOND; FRAMES 336-404 WERE EXPOSED AT 1/190 OF A SECOND. THE ENTIRE MISSION RECEIVED MAXIMUM DEVELOPMENT AND THE DIFFERENCE IN EXPOSURE CANNOT BE DETECTED. THE EXPOSURES ARE ACCEPTABLE AND THE ONLY LOSS OF INFORMATION IS IN SHADOW AREAS. IT IS RECOMMENDED THAT THE PRESENT EXPOSURES BE USED UNTIL SOLAR ELEVATIONS OR OTHER CONDITIONS AFFECTING THE EXPOSURE NECESSITATE A CHANGE.

5. PHOTOGRAPHY WAS NOT ACQUIRED DURING THE ASCENDING AND DESCENDING PORTIONS OF THE MISSION. THE ALTITUDE RANGED BETWEEN 79,600 AND 81,500 FEET. NO DATA REDUCTION PROBLEMS WERE ENCOUNTERED DURING VEHICLE MANEUVERING.

6. A TIME HISTORY OF EVENTS AFFECTING THE EXPLOITATION OF THE MATERIAL AT [REDACTED] BASED ON ELAPSED TIME FROM A/C TOUCHDOWN ARE:

TIME	EVENT
HR-MIN	
03-31	RECEIPT OF INS TRANSMISSION
06-26	RECEIPT OF D-VALUES
34-31	MATERIAL ARRIVED AT [REDACTED]
44-16	(1) RECEIPT OF UNTITLED REPRODUCTIONS AT SPECTRE
46-16	(1) FINAL FRAME EPHEMERIS COMPLETED
60-16	(1) INITIAL READ-OUT COMPLETED
61-16	(1) IPIR SENT FROM [REDACTED]

(1) THESE TIMES REFLECT THE DELAY IN THE RECEIPT OF THE MATERIAL AT [REDACTED]

7. THE ENTIRE MISSION WAS ACQUIRED WITH PROGRAMMED (CLOUD)

V/H. THE CAMERA SYSTEM CAGED 6 TIMES INCLUDING THE CAGING THAT IS NORMALLY EXPECTED IN VEHICLE TURNS. THE CAGING INDICATOR IN THE DATA CHAMBER DOES NOT CORRELATE EXACTLY WITH THE CAGING INDICATIONS ON THE INS TAPE. PERSONNEL FROM [ ] ARE INVESTIGATING THE REASON FOR THIS DISCREPANCY.

8. THERE IS NO INS DATA AVAILABLE FOR FRAMES 331 THROUGH 335. THESE FRAMES WERE ACQUIRED DURING CAMERA RUN-DOWN AFTER A CAMERA OFF AND ARE CONSIDERED BONUS FRAMES.

9. THE FILM METERED PROPERLY THROUGHOUT THE MISSION WITH OVERLAP OCCURRING ONLY AT THE CAMERA OFF/ONS. MINUS DENSITY STREAKS, CAUSED BY FOREIGN MATTER IN THE SLIT APERTURE, ARE MINIMAL. THERE ARE A SERIES OF HIGH DENSITY AREAS, VARYING IN SIZE AND SHAPE, BUT NEVER LARGER THAN 0.5 SQUARE CENTIMETERS. THESE AREAS APPEAR TO BE A REFLECTION AND ASSOCIATED WITH THE A/C HEADING RELATIVE TO THE SOLAR AZIMUTH. THEY APPEAR ON THE FORWARD FRAMES ONLY AND ARE RANDOMLY LOCATED BETWEEN 5.7 AND 8.1 INCHES FROM THE CENTER OF THE CLOCK AND BETWEEN 0.2 AND 2.6 INCHES FROM THE TIME TRACK NEAREST TO THE CLOCK. THEY CAN ONLY BE DETECTED IN FORTY-ONE FRAMES WHILE THE VEHICLE MAINTAINS A GROUND TRACK AZIMUTH OF 319 DEGREES 33 FEET PLUS AND MINUS 15 MINUTES. THEY DO NOT APPEAR IN ALL FRAMES WHEN THE VEHICLE MAINTAINS THIS GROUND TRACK AZIMUTH. THE PATTERN OF THE FLARE VARIES FROM LINEAR (ALONG TRACK) TO ELLIPTICAL (CROSS TRACK) AND IN SOME INSTANCES THEY ARE A SMALL GROUP OF DOTS. THEY ARE OF SUFFICIENT DENSITY TO OBSCURE IMAGERY.

10. CLOUDS OBSCURE 50 PERCENT OF THE IMAGERY. HOWEVER, THE MAIN AREAS OF INTEREST ARE LESS THAN 10 PERCENT CLOUD COVERED.



CLASSIFIED MESSAGE

MSG. 9-44

DATE

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1473.

CITE

PRIORITY

OXCART

SUBJ: EVALUATION OF BLACK SHIELD MISSION BX6709

1. CAMERA TYPE I (115A), UNIT E WAS USED ON MISSION BX6709.

PROCESSING WAS ACCOMPLISHED AT KWBAIL. THE MISSION CONTAINS 1330 TITLED FRAMES.

2. BOTH CAMERAS OPERATED SATISFACTORILY THROUGHOUT THE MISSION. DURING STRAIGHT AND LEVEL FLIGHT, GROUND RESOLUTION (ONE BAR PLUS ONE SPACE) OF 18 INCHES WAS OBTAINED ON IMAGERY NEAR THE VERTICAL. FOR ANALYTICAL PURPOSES, STRAIGHT AND LEVEL FLIGHT IS CONSIDERED AS ANY AREA WHERE THE CAMERA IS UNCAGED AND THE VEHICLE IS WITHIN THE CAMERA STABILIZATION LIMITS IN ROLL AND PITCH. THIS COMPRISES 42 PERCENT OF THE MISSION. IN AREAS OF COORDINATED TURNS AND VEHICLE MANEUVERING, THE IMAGE QUALITY REMAINS GOOD WITH MINIMAL SMEAR DUE TO VEHICLE MOTION. HOWEVER, IN A TURN, APPROXIMATELY 30 DEGREES OF SCAN OF ONE CAMERA IS GENERALLY UNUSABLE DUE TO IMAGING OF THE HORIZON. THE RESOLUTION (ONE BAR PLUS ONE SPACE) AT OBLIQUITY

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ANGLES 33 TO 39 DEGREES (8-18 NAUTICAL MILES LATERAL DISTANCE) IS ESTIMATED TO BE TWO TO THREE FEET. AT THE HIGHEST OBLIQUITY ANGLES OF 50 TO 67 DEGREES (18 TO 30 NAUTICAL MILES LATERAL DISTANCE). RESOLUTION IS ESTIMATED TO BE THREE TO FIVE FEET.

3. FRAMES 1-574 ARE EXPOSED AT  $1/190$  OF A SECOND; FRAMES 575-1192 ARE EXPOSED AT  $1/210$  OF A SECOND; AND FRAMES 1193-1330 ARE EXPOSED AT  $1/170$  OF A SECOND. ALL FRAMES RECEIVED MAXIMUM DEVELOPMENT AND THE DIFFERENCE IN EXPOSURE CANNOT BE DETECTED. ALL EXPOSURES APPEAR ACCEPTABLE FOR THE EXISTING CONDITIONS (SUN ANGLE, REFLECTIVITY, ETC.) UNDER WHICH THE MISSION WAS FLOWN. IN COMPARING GROUND AREAS EXPOSED IN THE FORWARD AND AFT CAMERAS AT THE SAME TIME, THE AFT FRAMES CONSISTENTLY HAVE HEAVIER DENSITY.

4. NO PHOTOGRAPHY IS ACQUIRED DURING THE ASCENDING AND DESCENDING PORTIONS OF THE MISSION. THE UNCORRECTED BAROMETRIC ALTITUDE RANGES BETWEEN 73900 AND 81200 FEET. NO DATA REDUCTION PROBLEMS HAVE BEEN ENCOUNTERED DURING VEHICLE MANEUVERING.

5. LONGITUDINAL MINUS DENSITY STREAKS ARE VISIBLE ON SOME FRAMES THROUGHOUT THE MISSION, BUT THEY ARE MINIMAL AND NO DEGRADATION IS APPARENT. PLUS DENSITY SPOTS AND ASSOCIATED STREAKS ARE PRESENT INTERMITTENTLY THROUGHOUT THE MISSION. IN EVERY INSTANCE, THE AREA AFFECTED DOES NOT EXCEED 0.25 SQUARE INCH AND APPEARS TO BE AN EXPOSURE OF A FOREIGN SUBSTANCE. FOR EXAMPLE, SEE FRAMES 1058 AND 1062.

6. MINOR OVERLAP OF CONSECUTIVE FORWARD/AFT FRAMES IS PRESENT APPROXIMATELY SIX TIMES DURING VEHICLE MANEUVERING. THE OVERLAP DOES NOT EXCEED 1.2 INCHES AND IN ONLY ONE CASE EXCEEDS 0.5 INCH. IMAGE DEGRADATION IS APPARENT ONLY IN THE OVERLAPPED, DOUBLE-

EXPOSED AREAS, FOR EXAMPLE SEE FRAMES 279/284 AND 1131/1134. THE DATA BLOCK ENCR OACHES INTO THE AFT FORMAT IN A SMALL NUMBER OF FRAMES. THE ENCR OACHMENT DOES NOT EXCEED 0.5 INCH. FOR EXAMPLE SEE FRAMES 262, 882, AND 1000.

7. PROGRAMMED V/H AND SENSED V/H ARE USED ON THIS MISSION. THE IMAGE QUALITY UNDER BOTH CONDITIONS IS SATISFACTORY. THE INS TAPE AND FILM DATA BLOCK INDICATES THAT THE MISSION WAS FLOWN IN AN UNCAGED CONDITION UNTIL FRAME 1315. ONLY FIVE FORWARD FRAMES ARE CAGED BETWEEN 1315 AND THE END OF THE MISSION (FRAME 1330).

8. THE CORRELATION OF THE INS TAPE, FILM DATA BLOCK AND IMAGERY IS SATISFACTORY BY ELAPSED TIME. THE INS TAPE RECORDS ONE MINUTE HIGHER THAN THE FILM DATA BLOCK FOR BOTH LATITUDE AND LONGITUDE. INS TAPE DATA IS NOT AVAILABLE FOR FRAMES 565-573, 1185-1191, AND 1325-1329. THESE FRAMES ARE FROM CAMERA RUNDOWN AFTER TURNOFF AND ARE CONSIDERED BONUS FRAMES.

9. A TIME HISTORY OF EVENTS AFFECTING THE EXPLOITATION OF THE MATERIAL BASED ON ELAPSED TIME FROM A/C TOUCHDOWN ARE:

TIME

HR-MIN

02 01	RECEIPT OF INS TRANSMISSION AT [REDACTED]
06 31	RECEIPT OF D-VALUES AT [REDACTED]
24 36	MATERIAL ARRIVED AT [REDACTED]
35 26	RECEIPT OF UNTITLED REPRODUCTIONS AT [REDACTED]
40 46	FINAL FRAME EPHEMERIS COMPLETED AT [REDACTED]
51 36	INITIAL READOUT OF MATERIAL COMPLETED
55 36	IPIR SENT FROM [REDACTED]

IN 92945

1473)

~~SECRET~~

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10. CLOUDS OBSCURE 45 PERCENT OF THE PHOTOGRAPHY. GROUND HAZE IS MINIMAL, AND IN CLOUD FREE AREAS GOOD QUALITY PHOTOGRAPHY IS AVAILABLE THROUGHOUT THE MISSION.

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